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ART. III.—*Victorian Tertiary Catenicellidae, Part II.*

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(With Plate III.)

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Introduction.

This paper consists of a revision of the fossil species of the genera of the Catenicellidae having a terminal gonoecium, which are here grouped in the sub-family Scuticellinae, containing the greatest number of genera and species in the Catenicellidae.

There is usually very little evidence to aid the correlation of gonoecia of the Scuticellinae with their zoococia, since during the process of fossilization, the chitinous joints between the zoococia and gonoecia decay, resulting in their separation and scattering, while in those genera with adnate ovicells the characters of the pertaining zoococia serve as evidence for correlation. Certain characteristics of the zoococia are sometimes expressed in the gonoecia, but a correlation can only be tentative in those genera with a large number of species. In those genera with few species, such as *Strophipora* Macgillivray, the choice is correspondingly restricted, and a correlation of the gonoecia with their zoococia is then possible.

Terminal gonoecia are extremely rare in Tertiary deposits owing to the small number produced by each zoarium; they are consequently of little importance in stratigraphical palaeontology, and are therefore not dealt with in this contribution, except where correlation has been possible.

A study of variation in the zoococia of Recent species (Stach, 1934), has shown the necessity for a considerable reduction in the number recorded from the Victorian Tertiary deposits. Macgillivray's figures (1895) of some of the species of this group are misleading, and Maplestone, who in many cases did not have the opportunity of examining Macgillivray's types, has unfortunately duplicated several of Macgillivray's species. This has been revealed by an examination of both Macgillivray's and Maplestone's type specimens. Maplestone has also described young zoococia of previously described forms as separate species.

In those genera having several species, keys have been supplied for ready identification. As far as possible, the least variable characteristics have been employed, but it is necessary to refer to the descriptions in order to check the identification of abnormal zoococia.

Systematic Description.

Sub-family VITTATICELLINAE.

Genus **Vittaticella** Maplestone, 1901.

VITTATICELLA ELEGANS (Busk, 1852).

(Pl. III., figs. 1-4.)

Catenicella elegans Busk, 1852, p. 361, fig. 2; *idem*, 1852, 2, p. 10, pl. ix., figs. 1-4. P. H. Macgillivray, 1859, p. 161; *idem*, 1868, p. 143. Hutton, 1880, p. 181. Jelly, 1889, p. 36. Ortmann, 1890, p. 27, pl. ii., fig. 1. Kirkpatrick, 1890, p. 17; *idem*, 1890, 2, p. 611. Thornely, 1905, p. 109.

Vittaticella elegans (Busk), Maplestone, 1901, p. 203. Waters, 1913, p. 484, pl. lxx., figs. 1-7, 12. Okada, 1921, p. 27. Livingstone, 1927, p. 57; *idem*, 1929, p. 99. Canu and Bassler, 1929, pp. 439, 440, text figs. 173 A, E, F, 174 A-N.

Catenaria elegans (Busk), Levinsen, 1909, p. 255, pl. xiii., figs. 3A-B, pl. xxi., fig. 2A.

Description.—To Levinsen's description (1909), it needs to be added that the narrow vittae have a single row of six to ten pores.

Dimensions.—Fossil specimen: Zooecium, length 0.42 mm., width 0.23; aperture, diameter 0.08. Recent specimen: Zooecium, length 0.41, width 0.22; aperture, diameter 0.08 (from Two Sisters' Is.).

Distribution.—Recent: Pacific Ocean: Bass Strait 48 fathoms, Port Dalrymple on stones at low water (Busk, 1852); "Challenger" station 188 (Torres Strait) 28 fathoms; 163 a off Two-fold Bay (N.S.W.) 150 fathoms, Port Cooper, Banks' Peninsula (Busk, 1884); off Two Sisters' Island (Bass Strait) (coll. J. Gabriel); Three Kings' Island 65 fathoms, Stewart Island 35 fathoms (New Zealand) (Livingstone, 1929); Sagamibai (Japan) (Ortmann, 1890); shallow sea at Hamajima and Kushi-moto (Japan) (Okada, 1921); Tizard bank (China Sea) 6 fathoms (Kirkpatrick, 1890); the authorities of the Australian Museum, Sydney, have kindly supplied the following additional Australian localities: Broughton Island (N.S.W.), 12-22 miles N. $\frac{1}{2}$ E. from Green Cape (N.S.W.) 39-46 fathoms, Port Darwin (Northern Territory), Noosa Head (South Queensland), Oyster Bay (Tasmania) 40 fathoms, Banks' Strait (Tas.), 50 miles S. of Cape Wiles (South Australia).

Indian Ocean: Gulf of Manaar, attached to floating oyster cages (Thornely, 1905); Arafura Sea, Zanzibar channel 10 fathoms (Waters, 1913); Algoa Bay (Busk, 1884).

Atlantic Ocean: Madeira, J. G. J. (*vide* Busk, 1884); "Challenger" station 135 Tristan da Cunha 60-1,100 fathoms, 122 South Atlantic 32-400 fathoms (Busk, 1884).

Lower Miocene: Forsyth's (below remanié nodule bed) on Grange Burn Creek (Hamilton).

Observations.—This well-known species, unlike the vast majority of the Catenicellidae, has a surprisingly wide distribution throughout tropical and temperate seas. This, however, constitutes its first record as a fossil. Maplestone (1904) has indicated that Waters had recorded this species from Muddy Creek and Curdie's Creek. It was, however, "*Catenicella elegans* var. *buskii*" which he recorded.

It appears to thrive in waters of moderate depth, but it is interesting to note Busk's record of its occurrence on stones at low water at Port Dalrymple.

As is usual with such a widespread species, it varies somewhat, particularly in its dimensions, length of vittae, and proportion of length to width. It is readily recognized, however, by its narrow vittae facing forward with a single row of pores, and the generally elongate form of the zooecia, which, however, does not approach the elongation of *V. praetenuis* (MacG., 1895), to which it is allied.

VITTATICELLA SPECIOSA (Macgillivray, 1895).

Catenicella elegans var. *buskii* Waters (non *C. buskii* Wyv.-Th.), 1881, p. 317, pl. xvi., figs. 42, 43; *idem*, 1883, p. 430. Jelly, 1889, p. 35.

Caloporella speciosa Macgillivray, 1895, p. 19, pl. ii., fig. 15.

Vittaticella speciosa (Macgillivray), Maplestone, 1901, p. 202; *idem*, 1904, p. 189. Stach, 1933, p. 90, pl. viii., figs. 1-3.

Vittaticella cruciformis Maplestone, 1911, p. 271, pl. xxxviii., fig. 13.

Observations.—The geminate pair figured by Waters (1881) has the vittae facing obliquely forward, whereas *Vittaticella buskii* (Wyv.-Th.) has the vittae facing laterally. His comparison of this form with *Cornuticella perforata* (Busk) is also disallowed by this observation. Maplestone (1904) has apparently referred this form to *Vittaticella elegans* (Busk), since the only localities given for it (under the name of *Catenicella elegans* Busk), are those given by Waters (1883), which Maplestone acknowledges. Waters did not record *V. elegans* Busk from the Victorian Tertiary. The form figured agrees in all respects with *Vittaticella speciosa* (MacG., 1895). The following additional locality should thus be added to those of *V. speciosa*; Curdie's Creek (Waters).

Marcus (1920) has included *C. elegans* var. *buskii* Waters (non *C. buskii* Wyv.-Th.) in his synonymy of *Catenicella buskii* Wyv.-Th.

**Artificial Key to the Tertiary Species of
Vittaticella Maplestone.**

- | | | | | | |
|----|---|---------------------------------------|----|------------------------------|--|
| 1. | { | Vittae facing forward | .. | 2 | |
| | | Vittae facing laterally | .. | 3 | |
| | | Vittae facing obliquely | .. | 4 | |
| | | Vittae with one row of pores .. | .. | 5 | |
| 2. | { | Vittae with two rows of pores .. | .. | <i>V. grandis</i> (Mapl.) | |
| | | Vittae with four rows of pores .. | .. | <i>V. enormis</i> (Mapl.) | |
| 3. | { | Zooecium ovate | .. | 6 | |
| | | Zooecium hastate | .. | <i>V. rostrata</i> (Mapl.) | |
| 4. | { | Vittae with one row of pores .. | .. | 7 | |
| | | Vittae with two rows of pores .. | .. | <i>V. speciosa</i> (MacG.) | |
| 5. | { | Length: width of zooecium as 2 : 1 .. | .. | <i>V. elegans</i> (Busk) | |
| | | Length: width of zooecium as 3 : 1 .. | .. | <i>V. praetenuis</i> (MacG.) | |
| 6. | { | Marginal flange in dorsal view .. | .. | <i>V. teres</i> (MacG.) | |
| | | No marginal flange in dorsal view .. | .. | <i>V. hannaforde</i> (MacG.) | |
| 7. | { | Length: width of zooecium as 3 : 1 .. | .. | <i>V. sacculata</i> (Busk) | |
| | | Length: width of zooecium as 2 : 1 .. | .. | <i>V. insignis</i> (MacG.) | |

Sub-family SCUTICELLINAE, sub.-fam. nov.

Description.—Internodes of one zoecium or a geminate pair, rarely three zoecia in each internode.

Avicularia well developed, usually facing laterally and situated about the level of the aperture; suprascapular and infrascapular compartments usually membranous, rarely calcified; one or two pairs of infrascapular compartments. Avicularia rarely present on adzoecial side of mother zoecium of geminate pair.

Sternal area may be ornamented by fenestrae, hollow spines separated by fissures, scattered pores, a submarginal row of pores around a central spinous area, or may be represented by a median ridge with a central pore.

Ovicell a terminal gonocium.

Genus *Scuticella* Levinsen, 1909.

Scuticella Levinsen, 1909, p. 221. Canu and Bassler, 1927, p. 21; *idem*, 1929, pp. 444, 446, 447, text-fig. 179.

Genotype.—*Scuticella plagiostoma* (Busk, 1852).

Observations.—This genus, well-described and figured by Levinsen (1909) and Canu and Bassler (1929), is characterized by its fenestrate sternal area and non-calcified suprascapular compartments. Although Levinsen designated no genotype, the first species, *S. plagiostoma* (Busk), which he described very fully, should be chosen, although a more typical species of this group could have been selected.

SCUTICELLA AURICULATA (Macgillivray, 1895).

Catenicella auriculata Macgillivray, 1895, p. 15, pl. ii., fig. 5.
Maplestone, 1904, p. 186.

Catenicella baccata Maplestone, 1899, p. 8, pl. ii., figs. 15, 15A;
idem, 1904, p. 186.

Description.—Zoecium elliptical in outline; greatest width, at middle level of zoecium, slightly greater than one-third length of zoecium.

Slightly convex proximal rim, in middle third of zoecium, situated one-third of distance proximally from distal connecting-tube aperture. Height of aperture equals half distance from proximal rim to distal connecting-tube aperture.

Elongate, semielliptical sternal area, equalling in length slightly more than one-third length of zoecium, has nine to thirteen fenestrae.

Scapular compartments, situated at level of distal half of aperture, lodge small avicularia facing obliquely forward. Suprascapular compartments well-developed, broad, and facing obliquely forward. Distal infrascapular compartments extend to middle level of zoecium, the proximal infrascapular compartment extending to base; both face obliquely forward.

Dorsal surface moderately convex, depressed at projecting distal angles. Axis of daughter zoecium inclined at 60 deg. to that of mother zoecium.

Ovicell not observed.

Dimensions.—Zoecium from Glencoe No. 7 bore 790 feet; Zoecium, length 0.56 mm., width 0.24; aperture, diameter 0.10.

Distribution.—Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Campbell's Point (Mulder), north side of Armstrong's Creek 10 chains east of Torquay-road, Mitchell River at Bairnsdale, Knight's bore at Dartmoor, Glencoe No. 7 bore 790 feet, Mooroduc No. 6 bore 4 feet-6 feet, Balcombe Bay.

Upper Oligocene: Glencoe No. 7 bore 1,270 feet.

Observations.—This species is characterized by its elongated zoecium and sternal area with nine to thirteen fenestrae and the small obliquely-directed avicularia, which, however, tend to become laterally-directed in old zoecia of this species.

The geminate pair described as *Catenicella baccata* by Maplestone (1899) agrees in every detail with *S. auriculata* (MacG.). The fact of its having opaque spots on the dorsal surface (it is not papillose as stated by Maplestone, 1899) is considered to be of no systematic value.

Waters (1904) has compared his *Catenicella frigida* with this species. It differs from *S. auriculata* (MacG.) in having only five to eight fenestrae, while the observed range in *S. auriculata* is nine to thirteen. There seems no doubt that these two species are distinct.

SCUTICELLA URNULA (Macgillivray, 1887).

(Plate III., figs. 5, 6.)

Catenicella urnula Macgillivray, 1887, p. 34, pl. i., figs. 2, 2A; *idem*, 1879-1890, dec. xv., p. 174, pl. 146, figs. 2, 2A; *idem*, 1887, 2, p. 197. Jelly, 1889, p. 39.

Catenicella nobilis Macgillivray, 1895, p. 9, pl. i., fig. 3. Maplestone, 1904, p. 187.

Catenicella acutirostris Maplestone, 1899, p. 9, pl. ii., fig. 19; *idem*, 1904, p. 186.

Scuticella urnula (Macgillivray), Levinsen, 1909, p. 231, pl. xi., figs. 4A-B, pl. xx., figs. 1A-E. Stach, 1934, p. 15, text-figs. 5A-B.

Description.—Levinsen (1909) has given a satisfactory diagnosis of this species.

Dimensions.—Zoecium from Mitchell River, Bairnsdale; Zoecium, length 0.61 mm., width 0.37; aperture, diameter 0.12.

Distribution.—Recent: Port Phillip Heads (Macgillivray).

Middle Miocene: Glencoe No. 7 bore, 330 feet.

Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Forsyth's (below remanié nodule bed) on Grange Burn (Hamilton), Campbell's Point (Mulder), Mitchell River at Bairnsdale.

Observations.—A comparison of Macgillivray's type of *Catenicella nobilis* and Maplestone's type of *Catenicella acutirostris* with Recent zoecia of *S. urnula* (MacG.) has shown that they differ in no essential feature.

This species is characterized by its prominent avicularia constantly facing directly forward. The size of the avicularia varies slightly in both fossil and Recent zoecia.

SCUTICELLA LORICA (Busk, 1852).

(Text-figs. 1-4.)

Catenicella lorica Busk, 1852, p. 358; *idem*, 1852, 2, p. 6, pl. i., figs. 1-3. Maplestone, 1882, p. 49. Jelly, 1889, p. 37 (early synonymy). Harmer, 1902, p. 310.

Scuticella lorica (Busk), Levinsen, 1909, pp. 215, 219. Stach, 1934, p. , text-figs. 3A, v.

Description.—Zoecium subrectangular in outline, tapering slightly to proximal connecting-tube aperture; greatest width, at summit of zoecium, equals two-thirds length of zoecium.

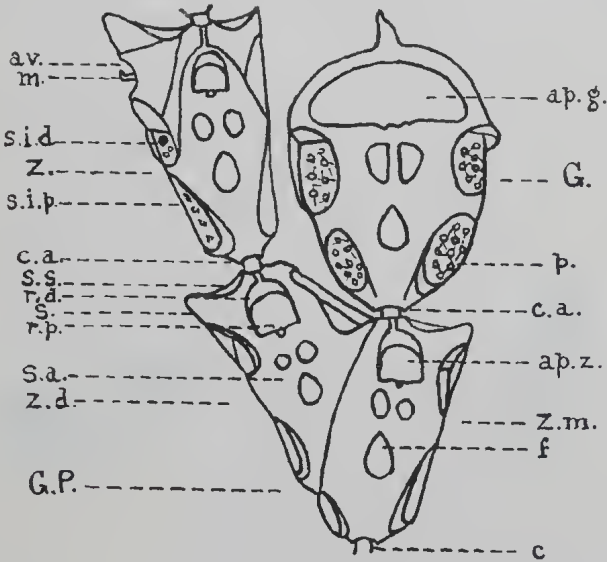


FIG. 1.

(Magnification $\times 45$.)

FIG. 1.—*Scuticella lorica* (Busk), fragment of zoarium illustrating terminology; ap.g., aperture of gonoecium; ap.z., aperture of zoecium; av., avicularium; c. connecting tube; c.a., connecting-tube aperture; f., fenestra; G., gonoecium; G.P., geminate pair; m., mandible; p., septulae; r.d., distal rim of aperture; r.p., proximal rim of aperture; s., scapular compartment; s.a., sternal area; s.i.d., distal infrascapular compartment; s.i.p., proximal infrascapular compartment; s.s., suprascapular compartment; Z., single zoecium; Z.d., daughter zoecium; Z.m., mother zoecium.

Straight proximal rim in middle third of zooecium, with partly closed small sinus, situated one-quarter of length of zooecium proximally from distal connecting-tube aperture. Lateral and distal margins as in *S. marginata* (Waters).

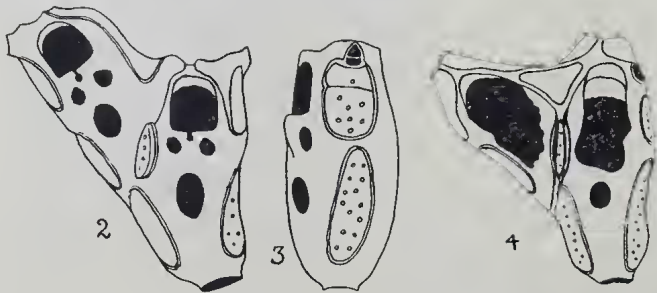
Broad, smooth sternal area, slightly elevated in region of proximal rim, has three large elliptical fenestrae, the proximal median fenestra, equalling about two-thirds area of aperture, being the largest.

Scapular compartments, variable in size, and usually lodging a small avicularium, situated at and above level of distal half of aperture, facing directly laterally. Upwardly-directed supra-scapular compartments shallow and of small extent. Distal infrascapular compartments, pierced by about seven septulae, reach almost to middle level of zooecium. Proximal infrascapular compartments pierced by numerous septulae, and flanged at their proximal extremities. Both infrascapular compartments face almost directly laterally.

Dorsal surface shows moderately convex elongated hexagonal area flanged at proximal and distal ends by lateral compartments.

Axis of daughter zooecium inclined at 40 deg. to that of mother zooecium of a geminate pair.

Gonoecium ovate in outline, erect, surmounted by an upwardly-projecting avicularium. Sternal area, two-thirds length of gonoecium, has three large fenestrae. Aperture almost equal in width to that of gonoecium. Height of aperture one-third its width. Two pairs of lateral compartments, below level of proximal rim, and facing obliquely forward, are pierced by numerous septulae.



FIGS. 2-4.

(Magnification $\times 45$).

FIG. 2.—*Scuticella lorica* (Busk). Recent incinerated geminate pair from Bass Strait cable. FIG. 3.—*S. lorica* (Busk). Recent incinerated single zooecium from Bass Strait cable showing avicularium and septulae of infrascapular compartments in side view. FIG. 4.—*S. lorica* (Busk). Fossil geminate pair from Mitchell River cliffs at Bairnsdale.

Dimensions.—Recent specimen, single zoecium: Zoecium, length 0.65 mm., width 0.41; aperture, diameter 0.1. Recent specimen, mother zoecium: Zoecium, length 0.60, width 0.27. Fossil specimen, mother zoecium: Zoecium, length 0.69, width 0.31.

Distribution.—Recent: Southern Australia: Bass Strait cable, off Two Sisters' Island (Bass Strait), Western Port (J. Gabriel); Bass Strait, 45 fathoms (Busk); off Devonport and Launceston (Tasmania), off Gabo Island 100-200 fathoms (Australian Museum coll.).

Lower Miocene: Mitchell River at Bairnsdale.

Observations.—This species is readily distinguished by its three large fenestrae and subrectangular outline.

A single geminate pair of this species was found fossil. It agrees closely with the dimensions of Recent zoecia, and shows the large elliptical proximal median fenestra, and a suggestion of the two distal fenestrae on the mother zoecium. The disposition of the lateral compartments is identical with that of *S. lorica*. Although the specimen is damaged, it undoubtedly belongs to this species.

The fossil and a Recent geminate pair are figured for comparison.

SCUTICELLA GIPPSLANDICA, sp. nov.

(Text fig. 7; Pl. III., figs. 7, 8.)

Catenicella marginata Macgillivray (non Waters), 1895, pl. i., fig. 26.

Description.—Zoecium somewhat elliptical in outline; greatest width, across centre of zoecium below avicularia, equals about two-thirds length of zoecium.

Straight proximal rim of aperture, in middle third of zoecium, situated slightly above level of greatest width, aperture extending less than half distance to summit from proximal rim, the much-thickened distal and lateral rims forming an arc greater than a semicircle. Two small denticles above level of proximal rim.

Scutiform sternal area extends two-thirds distance from proximal rim to distal connecting-tube aperture bordered by wide raised margins of infracapular compartments. Fenestrae six or seven.

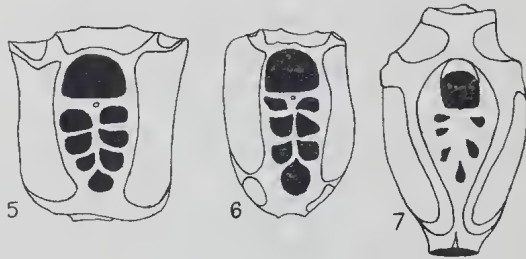
Scapular compartments, level with upper half of aperture, face directly laterally and equal in extent half height of aperture. A broad raised band descends from summit to distal rim and laterally to the scapular compartments, then to base, the latter branch bordering a single infracapular compartment on each side of zoecium facing obliquely laterally.

Dorsal surface smooth, moderately convex in axial region, merging into a distinct flange around lateral margins of zoecium.

Geminate pair or ovicell not observed.

Dimensions.—Holotype, from Mitchell River: Zoecium, length 0.69 mm., width 0.50; aperture, diameter 0.10. Specimen from Largon Creek: Zoecium, length 0.79, width 0.54; aperture, diameter 0.11.

Distribution.—Lower Miocene: Mitchell River at Bairnsdale, Largon Creek off Toorloo Arm (8 miles E. of Lakes Entrance).



FIGS. 5-7.

(Magnification $\times 45$).

FIG. 5.—*Scuticella wilsoni* (Macgillivray). Recent normal zoecium showing single long infrascapular compartment as found in *S. gippslandica* sp. nov. FIG. 6.—*S. wilsoni* (Macgillivray). Recent abnormal zoecium showing trace of development of a proximal infrascapular compartment. FIG. 7.—*S. gippslandica*, sp. nov. Zoecium showing the single long infrascapular compartment typical of this fossil species.

Observations.—Macgillivray has placed this distinctive form with *Scuticella marginata* (Waters) from which it differs in many respects. The elliptical outline, single infrascapular compartment and the lesser number of fenestrae distinguish this species.

It is closely allied to *Scuticella wilsoni* (MacG.) (1879-1890), both having a single long infrascapular compartment and seven fenestrae. *S. wilsoni*, however, differs in the distinctly quadrate outline and the greater proportionate width of its zoecia.

This somewhat rare species has shown but little variation except in the number of fenestrae and the dimensions mentioned above.

S. gippslandica is restricted to the Miocene deposits of Gippsland, to which feature it owes its specific designation.

SCUTICELLA AMPLA (Waters, 1881).

Catenicella ampla Waters, 1881, p. 317, pl. xvi., figs. 46, 50; *idem*, 1882, p. 259; *idem*, 1883, p. 429. Macgillivray, 1895, p. 9, pl. i., figs. 4-6. Maplestone, 1904, p. 186; *idem*, 1911, p. 266, pl. xxxvii., fig. 2.

- Catenicella stricta* Macgillivray, 1895, p. 15, pl. ii., fig. 6. Maplestone, 1904, p. 188.
- Catenicella lunipora* Macgillivray, 1895, p. 16, pl. ii., fig. 2. Maplestone, 1904, p. 187.
- Catenicella ovoidea* Macgillivray, 1895, p. 16, pl. ii., figs. 3, 4. Maplestone, 1904, p. 187.
- Calpidium morningtoniensis* Maplestone, 1898, p. 20, pl. ii., figs. 17, 18; *idem*, 1904, p. 190.
- Catenicella demanti* Maplestone, 1899, p. 9, pl. ii., fig. 17; *idem*, 1904, p. 187.

Description.—Zooecium subovate in outline; greatest width, at middle level of zooecium, equals about one-half its length.

Slightly convex proximal rim, made salient by elevation of distal median portion of sternal area, situated in middle third of zooecium one-quarter of distance proximally from distal connecting-tube aperture.

Broad sternal area, with five to nine pyriform fenestrae, equals in length two-thirds that of zooecium.

Scapular compartments extend from level of proximal rim to slightly above level of distal connecting-tube aperture and face directly laterally, appearing as auricular processes in frontal view. Suprascapular compartments small in extent and upwardly-directed. Distal infrascapular compartments extend to a level one-half to two-thirds distance proximally from distal connecting-tube aperture, proximal infrascapular compartments extending to base of zooecium. Both infrascapular compartments face obliquely backward.

Dorsal surface with a median longitudinal groove flanked by the depressions of the lateral compartments. Axis of daughter zooecium inclined at 30° to that of mother zooecium.

Ovicell not observed.

Dimensions.—Zooecium from Moorooduc No. 6 bore 4 feet-6 feet: Zooecium, length 0.71 mm., width 0.45; aperture, diameter 0.13. Zooecium from Glencoe No. 7 bore 790 feet: Zooecium, length 0.67, width 0.39; aperture, diameter 0.13.

Distribution.—Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Flinders, Torquay, Campbell's Point (Mulder), Griffin's near Batesford, Hamilton bore 80 feet-85 feet, Glencoe No. 7 bore 580 feet, 650 feet, 660 feet, 705 feet, 725 feet, 790 feet, Moorooduc No. 6 bore 4 feet-6 feet, Grice's Creek (near Frankston), Balcombe Bay, Mitchell River at Bairnsdale, Curdie's Creek.

Upper Oligocene: Glencoe No. 7 bore 1270 feet.

Observations.—This species is characterized by its large auricular laterally-directed avicularia and its distinctive dorsal surface, the appearance of which is caused by the infrascapular

compartments being directed obliquely backward. In some zoecia the infrascapular compartments tend to become laterally-directed.

An examination of the type specimen of *Catenicella stricta* MacG. revealed no fundamental difference from typical specimens of *S. ampla*, the zoecium being slightly more elongate than normal zoecia of this species.

Catenicella lunipora MacG. represents an old zoecium of *S. ampla*. It has the typical avicularia of the latter species, but has fewer fenestrae (five) and the infrascapular compartments tend to become laterally-directed, both departures being due to normal zoecial variation within species of the Catenicellidae (Stach, 1934).

Macgillivray's figures of *Catenicella ovoidea* show a frontal view in all respects similar to his figures of *S. ampla* (1895, pl. i., figs. 5, 6), but his representation of the dorsal view does not show the infrascapular compartments directed obliquely backward as is seen in Macgillivray's plesiotypes. This species was also recognized as *S. ampla* by T. S. Hall, who examined the Macgillivray collection after the latter's death.

The fenestrae of the type specimen of *Catenicella dennanti* Mapl. are not strongly bordered as Maplestone has figured them. The specimen has the same disposition of lateral compartments and the typical avicularia of *S. ampla*.

The apparent great protrusion of the distal rim of the aperture of *Calpidium morningtoniensis* Mapl. is exaggerated in Maplestone's figures, the specimen showing the thickened distal and lateral rims of the aperture accentuated by fracture of the elevated distal portion of the sternal area. This zoecium agrees in all respects with typical zoecia of *S. ampla*.

SCUTICELLA MARGINATA (Waters, 1881).

Catenicella marginata Waters, 1881, p. 317, pl. xvi., figs. 44, 45. Macgillivray, 1895, p. 13, pl. i., figs. 25-27. Maplestone, 1904, p. 187.

Catenicella daedala Macgillivray, 1895, p. 14, pl. i., fig. 28. Maplestone, 1898, p. 16, pl. i., figs. 4, 5; *idem*, 1904, p. 187.

Catenicella bairnsdalei Maplestone, 1911, p. 266, pl. xxxvii., fig. 8.

Description.—Zoecium oval in outline, slightly constricted near base; greatest width, one-third of distance proximally from distal connecting-tube aperture, equals one-half length of zoecium.

Proximal rim of aperture, in middle third of zoecium, situated one-third distance proximally from distal connecting-tube aperture. Aperture extends one half to two-thirds distance from proximal rim to distal connecting-tube aperture, lateral and distal margins forming an arc greater than a semicircle; distal rim greatly thickened. Proximal rim straight with two short denticles a short distance up lateral margins.

Elongate scutiform sternal area extends two-thirds distance from proximal rim to proximal connecting-tube aperture, bordered by wide raised margins of infrascapular compartments. Fenestrae, eight to eleven.

Scapular compartments, facing directly laterally, situated at middle level of aperture and equal in extent half height of aperture; a broad band extends half way round summit descending to and following distal rim, then branching out to scapular compartments, forming border of suprascapular compartments. Below scapular compartment is the small elliptical depressed area of the distal infrascapular compartment facing obliquely forward, extending one-third distance from base of scapular to proximal connecting-tube aperture, bordered by a broad raised band continuing around proximal infrascapular compartment which extends as a depressed elliptical area to base.

Dorsal surface smooth, very convex in axial region; lateral chambers form narrow flange around zoecium.

Axis of daughter zoecium inclined at 50 deg. to that of mother zoecium.

Ovicell unknown.

Dimensions.—Old zoecium from Mitchell River: Zoecium, length 0.92 mm., width 0.52; aperture, diameter 0.12. Young zoecium from Balcombe Bay: Zoecium, length 0.60, width 0.42; aperture, diameter 0.12.

Distribution.—Middle Miocene: Glencoe No. 7 bore, 330 feet.

Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Forsyth's (below remanié nodule bed), Flinders, Griffin's (near Batesford), Campbell's Point (Lake Connewarre), Thompson's Creek (south of Moriac), mouth of Spring Creek, north side of Armstrong's Creek 10 chains east of Torquay-road, Batesford Tunnel marl, Prowse's marl pit (2 miles west of Mount Moriac), Mitchell River at Bairnsdale, Largon Creek off Toorloo Arm (8 miles east of Lakes Entrance), Dartmoor (at foot of railway bridge over Glenelg River), Knight's bore (Dartmoor), Curdie's Creek (Waters), Hamilton bore 80 feet-85 feet, Glencoe No. 7 bore 650 feet-1,110 feet, Mooroduc No. 6 bore 4 feet-6 feet, Balcombe Bay.

Upper Oligocene: Glencoe No. 7 bore, 1,270 feet.

Observations.—This very common and widespread species varies considerably as regards size, proportion of length to width and convexity of dorsal surface.

In zoaria of the Catenicellidae there is a tendency for the early-formed zoecia to be larger in size, elongated, and with a slightly curved dorsal surface. The young zoecia at the summits of the curling tips of the branches tend to be shorter and more convex dorsally.

The form described as *Catenicella daedala* by Macgillivray, represents a young zoecium of *Scuticella marginata*, no fundamental difference being apparent between the two forms. Macgillivray's figured specimens of *C. marginata* represent old zoecia of the species.

An examination of Maplestone's type of *Catenicella bairnsdalei* shows that it is a rotund young zoecium of *S. marginata* (Waters).

This form is readily distinguished by the thick margins of the lateral compartments and the great thickening of the distal rim of the aperture.

SCUTICELLA PAPILLATA (Maplestone, 1899).

Catenicella papillata Maplestone, 1899, p. 7, pl. ii., figs. 14, 14A-B;
idem, 1904, p. 187.

Catenicella concinna Maplestone, 1911, p. 267, pl. xxxvii., fig. 5.

Description.—Zoecium elongate-oval in outline; greatest width, at upper level of scapular compartments, equals about half length of zoecium.

Slightly concave proximal rim, in middle third of zoecium, situated less than one-third distance proximally from distal connecting-tube aperture. Height of aperture slightly more than one-half distance from proximal rim to distal connecting-tube aperture. A pair of small denticles on lateral margins of aperture.

Small elongate sternal area, equal in length to one-third that of zoecium, with eight to ten fenestrae.

Scapular compartments, at level of distal rim of aperture, lodge small avicularia facing directly laterally. Suprascapular compartments face obliquely forward. Distal infrascapular compartments extend to middle level of zoecium, the proximal infrascapular compartments extending to proximal connecting-tube aperture; both face obliquely forward.

Dorsal surface moderately convex, slightly flattened at distal end of zoecium.

Axis of daughter zoecium inclined at about 80 deg. to that of mother zoecium.

Ovicell not observed.

Dimensions.—Syntype (single zoecium) from Clifton Bank; Zoecium, length 0.52 mm., width 0.29; aperture, diameter 0.09.

Distribution.—Lower Miocene: Campbell's Point (Lake Connewarre), Clifton Bank (Muddy Creek, Hamilton), Flinders, Batesford Tunnel marl, Knight's bore (Dartmoor), Hamilton bore 80 feet–85 feet, Balcombe Bay.

Observations.—An examination of the types of *Catenicella papillata* Maplestone and *C. concinna* Maplestone reveals no fundamental difference between the two specimens.

This species is characterized by its elongate oval outline and the position of the scapular compartments on a level with the distal rim of the aperture.

The "papillose dorsal surface" of Maplestone (1899) is seen to be quite smooth in the syntype (specimen showing dorsal view), but opaque white spots are visible in the otherwise transparent dorsal surface. This is believed to be due to external influences either in life or during preservation, and is therefore regarded as being of no specific value. Other specimens from the type locality (Clifton Bank) agree in every feature with the types, except in not having a spotted dorsal surface.

The name *Catenicella concinna* has previously been used by Macgillivray (1881) for a form which Maplestone (1899) and Jelly (1889) regard as synonymous with *Strongylopora pulchella* (Maplestone), and therefore Maplestone's name for his later *Catenicella concinna* (1911) could not be used in any case.

SCUTICELLA VENTRICOSA (Busk, 1852).

Catenicella ventricosa Busk, 1852, p. 357; *idem*, 1852, 2, p. 7, pl. ii., figs. 1, 2, pl. iii., figs. 1-5. Macgillivray, 1859, p. 160; *idem*, 1868, p. 143. Waters, 1883, p. 431. Kirchenpauer, 1885, p. 535. Jullien, 1888, p. 275, pl. xi., fig. 3. Jelly, 1889, p. 39 (early bibliography). Macgillivray, 1889, p. 25; *idem*, 1890, p. 6; *idem*, 1895, p. 9, pl. i., figs. 1, 2. Hamilton, 1898, p. 194. Maplestone, 1904, p. 188.

Scuticella ventricosa (Busk), Levinsen, 1909, p. 227, pl. xi., figs. 6A-B, pl. xx., figs. 5A-C. Livingstone, 1928, p. 116. Canu and Bassler, 1929, p. 439, text-fig. 173 D, p. 447, text-figs. 179 A-F. Livingstone, 1929, p. 97. Stach, 1934, text-figs. 6A-B.

Description.—Levinsen (1909) has given an excellent diagnosis of this species.

Dimensions.—Recent zoecium from Bass Strait: Zoecium, length 0.58 mm., width 0.39; aperture, diameter 0.13. Fossil zoecium from Mitchell River: Zoecium, length 0.55, width 0.33; aperture, diameter 0.13.

Distribution.—Recent: Victoria: Bass Strait 45 fathoms (Busk); Queenscliff, Western Port, Sealers' Cove (Macgillivray); off Two Sisters' Island (Bass Strait) (J. Gabriel coll.); Lorne, Glennie Group (Wilson's Promontory) (Austr. Mus. coll.). New South Wales: 3-4 miles off Eden (J. Gabriel coll.); Port Jackson, Newcastle, Broughton Island, 12-22 miles north $\frac{1}{2}$ east from Green Cape 39-46 fathoms, La Perouse (Botany Bay) (Austr. Mus. coll.). South Australia: Robe (Macgillivray); Sanders Bank (Kangaroo Island) (Austr. Mus. coll.). Tasmania: 7 miles north-east of Cape Pillar 50-60 fathoms, Oyster

Bay 40 fathoms, off Launceston and Devonport, Circular Head (Austr. Mus. coll.). New Zealand: Napier, Wellington, Dunedin, Foveaux Strait (Hamilton); Stewart Island 35 fathoms, 10 miles off Cape Maria van Diemen 50 fathoms, Colville Channel 35 fathoms (Livingstone).

Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Campbell's Point (Lake Connearre), Spring Creek (Torquay), Mitchell River at Bairnsdale, Glencoe No. 7 bore 705 feet; Moorooduc No. 6 bore, 4 feet-6 feet.

Observations.—This common species has a wide distribution in south-east Australian and New Zealand waters of moderate depth.

The fossil specimens have been compared with incinerated zoecia of typical Recent specimens from Bass Strait, with which they are identical. In the fossil specimens examined, however, the upward protrusion of the scapular compartments is invariably broken off.

SCUTICELLA LATA, sp. nov.

(Plate III., figs. 9, 10.)

Description.—Zooecium semielliptical in outline; greatest width, at level of distal connecting-tube aperture, almost equals length of zooecium.

Straight proximal rim, in middle third of zooecium, situated less than one-third of the distance proximally from distal connecting-tube aperture. Aperture semielliptical, equalling in height three-quarters of distance from distal connecting-tube aperture to proximal rim, below which is a large subcircular ascopore.

Broad sternal area equal in length to half of that of zooecium. Fenestrae five to seven.

Scapular compartments, at and above level of distal half of aperture, lodge small avicularia facing directly laterally. Upwardly-directed shallow suprascapular compartments of small extent. Distal infrascapular compartments extend to middle level of zooecium, proximal infrascapular compartments extending below it almost to proximal connecting-tube aperture, both facing obliquely forward.

Dorsal surface moderately convex, depressed at distal angles.

Axis of daughter zooecium inclined at 35 deg. to that of mother zooecium.

Ovicell not observed.

Dimensions.—Recent zooecium from Western Port: Zooecium, length 0.60 mm., width 0.49; aperture, diameter 0.14. Fossil zooecium from Forsyth's: Zooecium, length 0.53, width 0.43; aperture, diameter 0.14.

Distribution.—Recent: Western Port (J. Gabriel coll.).

Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Bell's Beach (between Torquay and Point Addis), Prowse's marl pit (2 miles west of Mount Moriac), Flinders, Forsyth's (below remanié nodule bed), Mitchell River at Bairnsdale.

Observations.—This species is characterized by the broad outline of the zoecium, the large scapular compartment projecting upward and the subcircular ascopore. The fossil specimens, although the sternal area is damaged in all those examined, agree in all other details with the Recent specimens, as will be seen from a comparison of the figures.

S. lata is allied to *S. margaritacea* (Busk) (1852), from which it is distinguished by its broader outline and comparatively large ascopore.

SCUTICELLA INTERMEDIA (Macgillivray, 1868).

(Text-figs. 8, 9.)

Catenicella intermedia Macgillivray, 1868, p. 127. Jelly, 1889, p. 37 (early bibliography). Macgillivray, 1895, p. 16, pl. ii., fig. 1. Maplestone, 1904, p. 187.

Scuticella intermedia (Macgillivray), Levinsen, 1909, pp. 215, 219. *Catenicella longispinosa* Maplestone, 1911, p. 268, pl. xxxvii., fig. 8.

Description.—Zoecium broadly semielliptical in outline; greatest width, at level of distal connecting-tube aperture, almost equals length of zoecium.

Slightly convex proximal rim, one-quarter width of zoecium in length, situated one-third distance proximally from distal connecting-tube aperture. Height of aperture equals three-quarters distance from proximal rim to distal connecting-tube aperture. A minute ascopore below proximal rim.

Ovate sternal area, equalling in length half that of zoecium, is ornamented with five to eight pyriform fenestrae varying considerably in size.

Scapular compartments, facing directly laterally, usually developed into large avicularia extending to level of distal connecting-tube aperture from level of proximal rim. Suprascapular compartments, of small extent, face forward and upward. Distal infrascapular compartments extend to a level almost one-half distance distally from proximal connecting-tube aperture, the proximal infrascapular compartments extending to base; both face obliquely laterally.

Dorsal surface slightly convex, flattened along lateral margins and distal angles of zoecium.

Axis of daughter zoecium inclined at 40 deg. to that of mother zoecium.

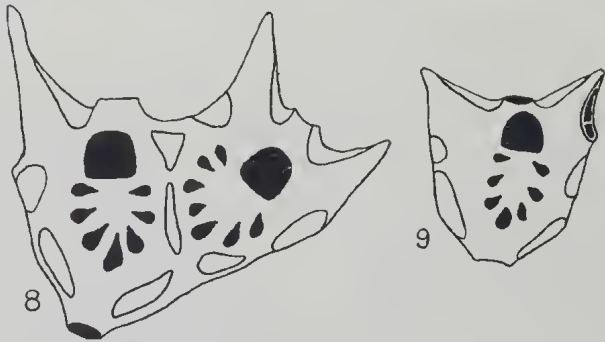
Ovicell not observed.

Dimensions.—Recent specimen: Zoecium, length 0.50 mm., width 0.46; aperture, diameter 0.13. Fossil zoecium from Campbell's Point: Zoecium, length 0.53, width 0.50; aperture, diameter 0.14.

Distribution.—Recent: Port Phillip Heads, off Launceston and Devonport (Tasmania) (Austr. Mus. coll.).

Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Flinders, Griffin's (near Batesford), Campbell's Point (Lake Connearre), Mitchell River at Bairnsdale, Balcombe Bay.

Observations.—This species is closely allied to *Scuticella lata*, sp. nov., from which it is distinguished by its very minute ascopore and the relatively large size of the fenestrae. In some zoecia the minute ascopore is only represented by a narrow sinus.



FIGS. 8, 9.

(Magnification $\times 45$).

FIG. 8.—*Scuticella intermedia* (Macgillivray). Maplestone's type of *Catenicella longispinosa*. FIG. 9.—*S. intermedia* (Macgillivray). Recent zoecium showing large avicularium approaching the size of those in Fig. 8.

This species is characterized by its minute ascopore and the large avicularia extending upward to the level of the distal connecting-tube aperture. No essential difference could be observed between fossil and Recent zoecia of this species.

The specimen described as *Catenicella longispinosa* by Maplestone (1911) is a mature zoecium of this species, in which the avicularia are very well developed. In the small fragment of a Recent zoarium examined by the author, some zoecia had avicularia approaching the size of those seen in Maplestone's specimen, and there appear to be no grounds for regarding *Catenicella longispinosa* Maplestone as a separate species.

Artificial Key to the Victorian Tertiary Species of *Scuticella* Levinsen.

- | | | | | |
|----|---|---|---|---------------------------------|
| 1. | { | Scapular compartments directed laterally .. | 2 | |
| | | Scapular compartments directed obliquely forward | | <i>S. auriculata</i> (MacG.) |
| 2. | { | Scapular compartments facing directly forward | | <i>S. urnula</i> (MacG.) |
| | | Sternal area with three oval fenestrae .. | | <i>S. lorica</i> (Busk) |
| 3. | { | Sternal area with more than three fenestrae | 3 | |
| | | One infrascapular compartment | | <i>S. gippslandica</i> sp. nov. |
| 4. | { | Two infrascapular compartments | 4 | |
| | | Non-spinous scapular compartment extending above level of distal connecting-tube aperture | | <i>S. ampla</i> (Waters) |
| 5. | { | Not as above | 5 | |
| | | Elongate sternal area bounded by thick margins of proximal lateral compartments | | <i>S. marginata</i> (Waters) |
| 6. | { | Not as above | 6 | |
| | | Scapular compartment developed upward into a hollow spine | | <i>S. ventricosa</i> (Busk) |
| 7. | { | Not as above | 7 | |
| | | Zooecium elongate | | <i>S. papillata</i> (Mapl.) |
| 8. | { | Zooecium broad | 8 | |
| | | Large sub-circular ascopore present | | <i>S. lata</i> sp. nov. |
| | { | Not as above | | <i>S. intermedia</i> (MacG.) |

Genus *Costaticella* Maplestone, 1899.

Costaticella Maplestone, 1899, p. 9. Canu and Bassler, 1927, p. 21; *idem*, 1929, pp. 445, 448, text-fig. 180.

Costicella Levinsen, 1909, p. 233.

Genotype.—*Costaticella lineata* (Macgillivray, 1895).

Observations.—An examination of Recent specimens of species of Levinsen's genus *Costicella* and fossil specimens of Maplestone's genus *Costaticella* shows that no generic distinction can be drawn between the fossil and Recent groups. *C. lineata* (MacG., 1895), has a sternal area similar in structure to that of *C. hastata* (Busk, 1852), and the lateral compartments are all calcified in both species. The form described as *Costaticella escharoides* by Maplestone (1899) is regarded as a mature zooecium of *C. lineata* (MacG., 1895), Macgillivray's holotype obviously being a young zooecium. Contrary to Maplestone's statement (1899), the sternal area has fenestrae at the base of the hollow spines, but they are comparatively small in his figured specimen.

Levinsen (1909) has given a good account of this genus, and the distinctive characteristics are seen to be that the lateral compartments are all calcified and that the sternal area is ornamented with a series of hollow spines separated by fissures and with a corresponding number of fenestrae at their bases.

Macgillivray's *Catenicella latifrons* (1895) has the lateral compartments partly uncalcified, and it is proposed to erect a new sub-genus *Costaticellina* for its reception. This sub-genus has all the characteristics of typical species of *Costaticella*, but differs in not having the suprascapular compartments calcified.

COSTATICELLA LINEATA (Macgillivray, 1895).

Catenicella lineata Macgillivray, 1895, p. 14, pl. i., fig. 30. Maplestone, 1904, p. 187.

Costaticella lineata (Macgillivray), Maplestone, 1899, p. 10. Canu and Bassler, 1929, p. 445.

Costaticella escharoides Maplestone, 1899, p. 10, pl. i., fig. 13; *idem*, 1904, p. 190.

Description.—Zooecium subrectangular in outline; width equals approximately one-half length of zooecium.

Slightly concave proximal rim, in centre third of zooecium, situated one-third of distance proximally from distal connecting-tube aperture. Height of aperture slightly greater than one-half distance from proximal rim to distal connecting-tube aperture.

Elongate sternal area, about three times as long as wide, has about 27 small oval fenestrae, with as many hollow spines separated by fissures and equals almost one-half length of zooecium.

Scapular compartments, situated at level of proximal half of aperture, face directly laterally. Suprascapular compartments extend slightly above level of distal connecting-tube aperture. Distal infrascapular compartments, facing directly laterally, extend slightly below middle level of zooecium, proximal infrascapular compartments extending to proximal connecting-tube aperture.

Dorsal surface depressed along lateral margins.

Axis of daughter zooecium inclined at 50 deg. to that of mother zooecium.

Ovicell not observed.

Dimensions.—Mother zooecium of Maplestone's figured specimen: Zooecium, length 0.70 mm., width 0.37; aperture, diameter 0.13.

Distribution.—Lower Miocene: Campbell's Point (Lake Connerwarre), Glencoe No. 7 bore 650 feet, Balcombe Bay.

Observations.—Canu and Bassler (1929) have erroneously named a figure of *Costaticella hastata* (Busk) taken from Harmer (1902) as *Costaticella lineata* (MacG.).

Macgillivray's type of *Catenicella lineata* is a young zooecium of Maplestone's *Costaticella escharoides*, as an examination of the type specimens readily shows. In the holotype of *C. lineata* the distal lateral compartments are not developed.

This species is characterized by its subrectangular outline and the elongated sternal area with the exceptionally large number of fenestrae and spines.

Contrary to Maplestone's statement (1899), small oval fenestrae are visible at the outer extremities of the spines of the sternal area of his figured specimen.

COSTATICELLA CRIBRIFORMIS (Waters, 1881).

Catenicella cribriformis Waters, 1881, p. 317, pl. xvi., fig. 39; *idem*, 1883, p. 428. Maplestone, 1904, p. 186.

Catenicella ampliata Maplestone, 1899, p. 8, figs. 16, 16A; *idem*, 1904, p. 186.

Description.—Zooecium broadly semielliptical in outline; greatest width, at summit of zooecium, equals slightly less than length of zooecium.

Straight proximal rim, equalling one-quarter width of zooecium in length, situated more than one-third distance proximally from distal connecting-tube aperture. Height of aperture equals nearly two-thirds distance from proximal rim to distal connecting-tube aperture.

Short broad sternal area, equalling in length slightly more than one-third length of zooecium, has ten to eleven fenestrae.

Small scapular compartments, situated at middle level of aperture, face laterally. Large suprascapular compartments extend above level of distal connecting-tube aperture. Distal infrascapular compartments extend to a level almost two-thirds distance proximally from distal connecting-tube aperture and face laterally. Proximal infrascapular compartments extend to base, and face obliquely forward.

Dorsal surface not observed.

Axis of daughter zooecium inclined at 40 deg. to that of mother zooecium.

Ovicell not observed.

Dimensions.—Zooecium from Balcombe Bay: Zooecium, length 0.59 mm., width 0.55; aperture, diameter 0.14.

Distribution.—Lower Miocene: Griffin's (near Batesford), Campbell's Point (Lake Connemara), Spring Creek (Torquay), Curdie's Creek (Waters), Balcombe Bay.

Observations.—Of this rare species only the two specimens on Maplestone's type slide have been seen. The one which Maplestone did not figure is the more perfect.

This species is characterized by the broadness of the zooecium and its ten to eleven fenestrae. The type specimen figured by Waters (1881) is not as broad as the zooecia designated *Catenicella ampliata* by Maplestone (1899), but otherwise there is no essential difference between the two forms.

COSTATICELLA BENECOSTATA (Levinsen, 1909).

(Pl. III., figs. 11, 12.)

Catenicella hastata Waters (non Busk, 1852), 1883, p. 431. Jelly, 1889, p. 37 (Waters, 1883 only). Macgillivray, 1895, p. 13, pl. i., figs. 21-23. Maplestone, 1904, p. 187.

Costicella benecostata Levinsen, 1909, p. 237, pl. xii., figs. 1A-B, pl. xx., fig. 9A.

Observations.—Levinsen (1909) has given a figure of the aperture and sternal area of this species, but gives no idea of the general outline of the zoecium either in the description or figure. He has, however, named his figures on the plate *Catenicella hastata*, and it may be assumed that the general appearance of the zoecium is that of *Costaticella hastata* (Busk, 1852).

The sternal area of Macgillivray's (1895) figured specimens and of all the specimens examined agree exactly with Levinsen's figures. The observed range in the number of fenestrae was nine to fourteen.

This species differs from *Costaticella hastata* (Busk) in the more elongate form of the zoecium and sternal area and the greater number of fenestrae.

Waters (1883) has recorded *Catenicella hastata* from Waurn Ponds and Torquay, but this is open to doubt since no specimen in the National Museum collections or in those of the author can be referred to *Costaticella hastata* (Busk).

Recent specimens of *C. benecostata* have not been available for examination and comparison.

Dimensions.—Zoecium from Clifton Bank (Muddy Creek): Zoecium, length 0.47 mm., width 0.28; aperture, diameter 0.10.

Distribution.—Recent: Western Port (Levinsen).

Lower Miocene: Waurn Ponds and Spring Creek (Torquay) (Waters), Clifton Bank (Muddy Creek, Hamilton), Griffin's (near Batesford), Campbell's Point (Lake Connemara), Batesford Tunnel marl dump, Mitchell River at Bairnsdale, Glencoe No. 7 bore 580 feet-790 feet, Balcombe Bay.

COSTATICELLA HIULCA (Maplestone, 1899).

Catenicella hiulca Maplestone, 1899, p. 9, pl. ii., fig. 18; *idem*, 1904, p. 187.

Costicella cuspidata Levinsen, 1909, p. 235, pl. xx., figs. 6A-C.

Description.—Levinsen (1909) has given a satisfactory diagnosis of this species.

Dimensions.—Of holotype: Zoecium, length 0.53 mm., width 0.49; aperture, diameter 0.11. Recent zoecium from Western Port: Zoecium, length 0.47, width 0.42; aperture, diameter 0.11.

Distribution.—Recent: Port Phillip (Levinsen), Western Port (J. Gabriel, coll.).

Lower Miocene: Clifton Bank (Muddy Creek, Hamilton).

Observations.—A comparison of Recent specimens with Maplestone's type of *Catencella hiulca* shows that these two forms are identical. Maplestone's obscure figure is rather misleading, but an examination of the specimen leaves no doubt as to the two forms being conspecific.

This species is characterized by its broad zoecium and its sternal area with seven to ten fenestrae and spines.

Sub-genus **Costaticellina**, sub-gen. nov.

Description.—This sub-genus has all the characters of the genus *Costaticella* Maplestone, except that the suprascapular compartments are not calcified.

Observations.—This sub-genus has been erected for the reception of *Catencella latifrons* Macgillivray, which differs from all other species of *Costaticella* in having uncalcified suprascapular compartments.

COSTATICELLA (COSTATICELLINA) LATIFRONS (Macgillivray, 1895).

Catencella latifrons Macgillivray, 1895, p. 15, pl. i., fig. 31.
Maplestone, 1904, p. 187.

Plicopora daedala Macgillivray, 1895, p. 26, pl. iv., fig. 4.

Catencella orbicularis Maplestone, 1898, p. 15, pl. i., fig. 1; *idem*, 1904, p. 187.

Description.—Zoecium broadly subovate in outline; greatest width, at level of scapular compartments, almost equals length of zoecium.

Slightly concave proximal rim, in middle third of zoecium, situated one-quarter of distance proximally from distal connecting-tube aperture. Height of aperture equals two-thirds distance from proximal rim to distal connecting-tube aperture.

Sub-circular sternal area, equalling in length nearly three-quarters that of zoecium, is ornamented by about fifteen hollow spines separated by fissures with a corresponding number of fenestrae.

Scapular compartments, at level of distal half of aperture, face laterally or obliquely upward. Restricted suprascapular compartments face upward and obliquely forward. Distal infrascapular compartments extend to middle level of zoecium and proximal infrascapular compartments extend to proximal connecting-tube aperture, both facing directly laterally.

Dorsal surface depressed in middle line and along the lateral and distal margins.

Axis of daughter zoecium inclined at 30 deg. to that of mother zoecium.

Ovicell not known.

Dimensions.—Mother zoecium of holotype: Zoecium, length 0.56 mm., width 0.42; aperture, diameter 0.14.

Distribution.—Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Griffin's (near Batesford), Campbell's Point (Lake Connemara), Flinders, Glencoe No. 7 bore 580 feet, Moorooduc No. 6 bore 4 feet-6 feet, Balcombe Bay.

Observations.—This species is characterized by its broad outline and the very large sternal area. The latter is not always preserved, but the bases of the hollow spines may be seen as a submarginal row of crenulations.

Macgillivray's *Plicopora daedala*, which he has figured with the distal end downwards, is an old zoecium of this species which has the sternal area worn off.

Maplestone's *Catenicella orbicularis* is a well-preserved old zoecium of this species, and differs in no essential feature from *C. latifrons*.

Artificial Key to the Victorian Tertiary Species of *Costaticella* Maplestone.

- | | | | |
|----|---|---|--|
| 1. | { | Suprascapular compartments not calcified | <i>C. (Costaticellina) latifrons</i> (MacG.) |
| | { | Suprascapular compartments calcified .. 2 | |
| 2. | { | More than twenty-five fenestrae .. 2 | <i>C. lineata</i> (MacG.) |
| | { | Less than twenty-five fenestrae .. 3 | |
| 3. | { | Length: width of zoecium as 1:1 | <i>C. cribriformis</i> (Waters) |
| | { | Length: width of zoecium as less than 1:1 | 4 |
| 4. | { | Zoecium elongate | <i>C. benecostata</i> (Levinsen) |
| | { | Zoecium broad | <i>C. hiulca</i> (Maplestone) |

Genus *Digenopora* Maplestone, 1899.

Digenopora Maplestone, 1899, p. 6. Canu and Bassler, 1927, p. 21; *idem*, 1929, p. 449, text figs. 181 C, D.

Genotype.—*Digenopora retroversa* (Macgillivray, 1895).

Observations.—Maplestone (1899) described the single species *Digenopora compta* as belonging to this genus, but an examination of the type specimen of *Catenicella retroversa* (Macgillivray, 1895), shows it to be an old zoecium of Maplestone's *Digenopora compta*, between which a connecting series can readily be obtained.

The distinctive characteristics of this genus are that the suprascapular compartments are not calcified, and the frontal combines the sternal ornamentation of *Costaticella* Maplestone, 1899, and *Strongylopora* Maplestone, 1899.

This genus is placed provisionally in the sub-family Scuticellinae since no ovicell which can be correlated with the genotype has been discovered. Its general affinities are, however,

with this group, as is shown by its uncalcified suprascapular compartments and its sternal area ornamented by hollow spines as in *Costaticella*, but with the additional submarginal row of oval pores, typical of *Strongylopora* Maplestone, 1899 which, however, is not a member of the Scuticellinae.

To Maplestone's description (1899) should be added, that the suprascapular compartments are not calcified.

DIGENOPORA RETROVERSA (Macgillivray, 1895).

Catenicella cribraria Macgillivray (non Busk, 1852), 1895, pl. i., fig. 20.

Catenicella retroversa Macgillivray, 1895, p. 13, pl. i., fig. 24. Maplestone, 1904, p. 188.

Digenopora compta Maplestone, 1899, p. 6, pl. i., figs. 10, 10a; *idem*, 1904, p. 190. Canu and Bassler, 1929, p. 449, text figs. 181 C, D.

Description.—Zooecium ovate in outline; greatest width, at level of scapular compartments, equals two-thirds length of zooecium.

Broad short sternal area, less than one-third length of zooecium, bears seven to nine hollow spines and fenestrae. A submarginal row of nine to thirteen oval fenestrae borders the sternal area.

Scapular compartments, at and above level of distal rim of aperture, lodge small avicularia facing directly laterally and slightly upward. Forwardly and upwardly-directed shallow suprascapular compartments have a proximal extension bordering distal rim of aperture. Distal infrascapular compartments, facing directly laterally, extend to middle level of zooecium, proximal infrascapular compartments extending to proximal connecting-tube aperture.

Slightly convex proximal rim, in middle third of zooecium, situated more than one-third distance proximally from distal connecting-tube aperture. Height of aperture equals one-half to two-thirds distance from proximal rim to distal connecting-tube aperture.

Dorsal surface depressed at lateral margins and distal angles of zooecium.

Axis of daughter zooecium inclined at 50 deg. to that of mother zooecium.

Ovicell not known.

Dimensions.—Mature zooecium from Balcombe Bay: Zooecium, length 0.63 mm., width 0.46; aperture, diameter 0.14. Old zooecium from Hamilton bore 80 feet-85 feet: Zooecium, length 0.55, width 0.48; aperture, diameter 0.14.

Distribution.—Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Campbell's Point (Lake Connemara), Griffin's (near Batesford), Flinders, Hamilton bore 80 feet-85 feet, Mitchell River at Bairnsdale, Glencoe No. 7 bore 650 feet, 705 feet, 790 feet, Moorooduc No. 6 bore 4 feet-6 feet, Balcombe Bay.

Upper Oligocene: Glencoe No. 7 bore 1,270 feet.

Observations.—Macgillivray's figure of *Catenicella retroversa* represents an old zoecium of the same species as the mature zoecia figured by Maplestone (1899) under the name of *Digenopora compta*. In old zoecia of this species the lateral margins tend to become backwardly-directed, and the sternal area is more heavily calcified; the outline of the zoecium becomes sub-circular.

The specimen figured by Macgillivray (1895) under the name of *Catenicella cribraria* is seen on examination to be a zoecium of this species, as suggested by Maplestone (1899) who, however, also thought it might be a distinct species.

The position of the avicularia, the characters of the sternal area and the suprascapular compartments extending around the distal rim of the aperture are distinctive features of this species.

Genus **Cribricellina** Canu and Bassler, 1927.

Cribricella Levinsen, 1909, pp. 220, 238 (name preoccupied by Canu, 1902, *vide* Canu and Bassler, 1927).

Cribricellina Canu and Bassler, 1927, p. 21; *idem*, 1929, p. 449, text fig. 182.

Genotype.—*Cribricellina rufa* (Macgillivray, 1868).

Observations.—This very natural group is characterized by the sternal area being perforated by scattered pores and by the presence of uncalcified suprascapular compartments. Levinsen's name, as pointed out by Canu and Bassler (1927), is preoccupied (Canu, 1904).

CRIBRICELLINA CRIBRARIA (Busk, 1852).

Catenicella cribraria Busk, 1852, p. 359; *idem*, 1852, 2, p. 9, pl. v., figs. 3, 4. Macgillivray, 1859, p. 161; *idem*, 1868, p. 143. Jelly, 1889, p. 36 (early bibliography). Macgillivray, 1889, p. 25; *idem*, 1895, p. 12. Hamilton, 1898, p. 194. Maplestone, 1904, p. 186.

Cribricella cribraria (Busk), Levinsen, 1909, p. 240, pl. xii., figs. 8 a-c.

Cribricellina cribraria (Busk), Canu and Bassler, 1929, p. 450, text figs. 182 H-K. Livingstone, 1929, p. 97. Stach, 1934, p. 15.

Description.—Levinsen (1909) has given an adequate description of this species.

Dimensions.—Recent zoecium: Zoecium, length 0.47 mm., width 0.38; aperture, diameter 0.11. Zoecium from Glencoe No. 7 bore 330 ft.; Zoecium, length 0.53, width 0.35; aperture, diameter, 0.11.

Distribution.—Recent: Victoria: Queenscliff, Port Phillip, Sealers' Cove (Macgillivray); off Two Sisters' Is. (J. Gabriel coll.); Griffith's Point (Aust. Mus. coll.). New South Wales: 3-4 miles off Eden 25-30 fathoms, 12-22 miles N. $\frac{1}{2}$ E. from Green Cape 39-46 fathoms (Aust. Mus. coll.). Queensland: Port Denison (Aust. Mus. coll.). Tasmania: off Launceston and Devonport (Aust. Mus. coll.). New Zealand: Akaroa (Levinsen); Napier, Wellington, Dunedin (Hamilton); Three Kings' Is. 65 fathoms, Colville Channel (Livingstone).

Middle Miocene: Glencoe No. 7 bore 330 feet.

Lower Miocene: Clifton Bank (Muddy Ck., Hamilton), Campbell's Point (Lake Connemara), Mitchell River at Bairndale, Balcombe Bay.

Observations.—The zoecia of this species are very variable in character. Old zoecia show very large and well-marked sub-marginal pores, and are larger and much more elongated than younger zoecia. There is no doubt of the identity of the fossil specimens with Recent zoecia.

The specimen figured by Macgillivray (1895) as *Catenicella cribraria* is seen on examination to be a zoecium of *Digenopora retroversa* (MacG.), 1895, but many authentic specimens of *Cribricellina cribraria* (Busk, 1852), have been seen in the Macgillivray collection.

Genus **Strophipora** Macgillivray, 1895.

Strophipora Macgillivray, 1895, p. 17. Levinsen, 1909, p. 257.
Canu and Bassler, 1929, p. 449, text fig. 184.

Genotype.—*Strophipora harveyi* (Wyville-Thompson, 1858).

Observations.—The terminal gonoecia described as *Strophipora triangularis* and *S. episcopalis* by Maplestone (1911, 1913) are regarded as ovicells of the genotype, and on this evidence (p. 45) this genus is placed in the sub-family Scuticellinae. Wyville-Thompson's diagnosis (1859) of the ovicell of the genotype is believed to be a description of an abnormal avicularium such as that figured by the author (1934, text fig. 9g).

Canu and Bassler (1929) have proposed that Macgillivray's genera *Stenostomaria*, *Microstomaria* and *Ditaxipora* should be made sub-genera of the genus *Strophipora*. The form described as *Strophipora bellis* by Maplestone (1898) shows an ovicell surmounting the mother zoecium of a triglobulus, the daughter zoecium of which has the distinctive characters of *Stenostomaria solida* (Waters). Maplestone (1899) later figures the distal portion of a similar specimen, naming it the ovicell of *S. solida* (Waters). The ovicell of *Stenostomaria* is thus shown to belong to the mother zoecium of a triglobulus, as is also the case in the genera *Pterocella* Levinsen, *Claviporella* Macgillivray, and

Strongylopora Maplestone. Since *Stenostomaria* has a different type of ovicell from that found in the genus *Strophipora*, it should retain generic rank.

The affinities of the genus *Microstomaria* Macgillivray with the Catenicellidae are very doubtful. The holotype of the genotype, *M. tubulifera* Macgillivray, does not show any distal connecting-tube apertures, and until a series of specimens have been examined, its validity must remain in doubt.

The zoarial habit of *Ditaxipora* appears to be sufficiently distinctive for the retention of its generic rank.

Levinsen (1909) has given a good diagnosis of *Strophipora*.

STROPHIPORA HARVEYI (Wyville-Thompson, 1858).

Catenicella harveyi Wyville-Thompson, 1858, p. 137 (*vide* Nickles and Bassler (1900) and Macgillivray (1895)); *idem*, 1859, p. 145. Jelly, 1889, p. 37 (early bibliography).

Strophipora harveyi (Wyville-Thompson), Macgillivray, 1895, p. 17, pl. ii., figs. 9-12. Maplestone, 1904, p. 188. Levinsen, 1909, p. 258, pl. xxi., figs. 6 a-f. Canu and Bassler, 1929, p. 449, text fig. 184. Stach, 1934, p. 15, text figs. 9 a-g.

Strophipora triangularis Maplestone, 1911, p. 268, pl. xxxviii., figs. 9, 9a.

Strophipora laevis Maplestone, 1911, p. 269, pl. xxxviii., fig. 10.

Strophipora episcopalis Maplestone, 1913, p. 355, pl. xxvii., fig. 2.

Description.—Levinsen (1909) has amply described and figured zoecia of this species and Maplestone (1911, 1913) has described and figured the ovicell.

Dimensions.—Zooecium from Forsyth's (below remanié nodule bed). Zooecium, length 0.54 mm., width 0.27; aperture diameter 0.10.

Distribution.—Recent: Bass Strait (Wyville-Thompson), Western Australia (*vide* Maplestone, 1904).

Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Batesford Tunnel marl, Waurn Ponds, Spring Creek (Torquay), Fyansford, Griffin's (near Batesford), Campbell's Point (Lake Connewarre), Bell's Beach (between Torquay and Pt. Addis), Forsyth's below remanié nodule bed (Grange Burn, Hamilton), Mitchell River at Bairnsdale, Nhill (Maplestone), Hamilton bore 80 feet-85 feet, Glencoe No. 7 bore 580 feet, 650 feet, 705 feet, 725 feet, Balcombe Bay.

Observations.—This species is characterized by its elongate oval outline and proportion of length to width. Old zoecia tend to become broader and very rotund, the small avicularia generally facing forward. These characters serve to distinguish old zoecia of this species from zoecia of *Strophipora lata* Macgillivray.

This distinctive species varies considerably, particularly as regards the form of the avicularia as pointed out by the author (1934). Unfortunately, no Recent specimens were available for examination, and Wyville-Thompson's original paper (1858) was inaccessible to the author. However, a review of his paper has been given (1859) together with the original descriptions of the species, and this, together with Levinsen's description and figures (1909) of zoecia from the original zoarium taken by Harvey, form the basis of comparison.

The fossil forms agree with Levinsen's description and figures, but since he only dealt with a small fragment of the zoarium, it is possible that all the variations recorded by the author (1934) in fossil zoecia did not appear on this fragment. Levinsen (1909) did, however, record a certain amount of variation in size and position of the avicularia.

The ovicell of this species has been described by Wyville-Thompson (1859) as follows, "Ovicell calyptriform; sessile by a broad base in the position of one of the avicularian processes of the cell, which it replaces. Back of ovicell furnished with a very large sessile avicularium." It is believed that Wyville-Thompson has described a large avicularium, similar to that figured by the author (1934, text-fig. 9G), being deceived into regarding this as an ovicell by the large swelling seen in frontal view. This also strengthens the belief that the abnormal forms figured (Stach, 1934) come under the category of zoecial variation.

The ovicell is believed to be a terminal gonocidium, and the forms described as *Strophipora triangularis* (1911) and *S. episcopalis* (1913) by Maplestone are correlated with this species. The evidence for this correlation is that three specimens of this type of ovicell are known, and *S. harveyi* is by far the most prolific species of the genus *Strophipora*. The ovicell of *S. excavata* Maplestone, represented by a single specimen in the Macgillivray collection, has certain features in common with its zoecia, and by a process of elimination these ovicells must belong to *S. harveyi* since Maplestone has recorded them from localities at which *S. harveyi* is common, but from which *S. lata*, the remaining species, has not been recorded.

The form described as *Strophipora laevis* by Maplestone (1911) is obviously a young zoecium of *S. harveyi*, the "curved spinous processes arching over the distal part" being the beginning of the development of the distal boundaries of the lateral compartments.

Macgillivray's *S. harveyi* var. *porosa* (1895) is regarded as a zoecium in which excessive calcification of the septulae has made them salient. Calcification of pores is a common feature in old zoecia of species of the Catenicellidae. It may here be stressed that it is practically useless to give fossil forms varietal

standing from a study of a series of isolated zoecia, since it is almost impossible to decide whether the distinctive character does or does not come under the category of zoecial variation.

STROPHIPORA EXCAVATA Maplestone, 1899.

Strophipora excavata Maplestone, 1899, p. 10, pl. ii., figs. 20, 20a;
idem, 1904, p. 188.

Strophipora sulcata Maplestone, 1899, p. 10, pl. ii., figs. 21, 21a;
idem, 1904, p. 188.

Description.—Zoecium sub-triangular in outline tapering to proximal connecting-tube aperture, lateral margins concave; greatest width, at summit of zoecium, equals half length of zoecium.

Slightly concave proximal rim, one-third width of zoecium in length, situated one-third distance proximally from distal connecting-tube aperture. Height of aperture equals two-thirds distance from proximal rim to distal connecting-tube aperture.

Large elliptical pore, situated in centre of zoecium one-third distance proximally from proximal rim to proximal connecting-tube aperture, surrounded by a raised band extending from proximal rim to proximal connecting-tube aperture.

Small scapular compartments, situated at level of distal rim of aperture, face directly laterally or surmount forwardly-directed short tubular prominences. Small suprascapular compartments face obliquely forward and upward. Long forwardly-directed infrascapular compartments extend from level of distal rim of aperture to proximal connecting-tube aperture, perforated by about five septulae.

Dorsal surface with a broad median longitudinal ridge raised at the margins.

Axis of daughter zoecium inclined at 50 deg. to that of mother zoecium.

Ovicell a terminal gonoecium transversely elliptical in outline. The aperture, facing obliquely downward, equals one-half length of zoecium; slightly concave proximal rim situated less than half distance proximally from proximal connecting-tube aperture to summit of ovicell. Oval pore below proximal rim in centre of raised band extending from proximal rim to proximal connecting-tube aperture. About five septulae pierce depressed areas on either side of raised band. A large pore pierces ovicell above distal rim of aperture.

Dorsal surface very convex with a median broad raised band giving off lateral branches at level of proximal rim.

Dimensions.—Zoecium from Clifton Bank: Zoecium, length 0.45 mm., width 0.30; aperture, diameter 0.11. Ovicell from Clifton Bank: Length 0.83, width 0.92; aperture, diameter 0.48.

Distribution.—Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Flinders, Campbell's Point (Lake Connewarre), Glencoe No. 7 bore, 580 feet.

Observations.—This species is characterized by its outline and the more proximal position of the central pore.

An ovicell from Clifton Bank, where this species is most prolific, was found in the Macgillivray collection. It is correlated with this species mainly on the characters of the central pore and of the depressions on either side of the raised median band.

Maplestone's *Strophipora sulcata* (1899) is a zoecium of this species with large avicularia which decrease the extent of the depressions on either side of the median ridge seen in dorsal view. A series of zoecia can readily be obtained to link these two forms, and they undoubtedly both belong to the same species.

STROPHIPORA LATA Macgillivray, 1895.

Strophipora harveyi, var. *lata* Macgillivray, 1895, p. 18, pl. ii., fig. 12.

Description.—Zoecium broadly semielliptical in outline; greatest width, at summit of zoecium, equals length of zoecium.

Concave proximal rim, in centre third of zoecium, situated almost one-half distance proximally from distal connecting-tube aperture. Height of aperture equals three-quarters of distance from proximal rim to distal connecting-tube aperture. A pair of stout downwardly-curved denticles situated one-third distance distally from proximal rim to distal rim of aperture which is salient.

Large circular pore, situated in centre of zoecium one-third distance distally from proximal connecting-tube aperture to summit of zoecium, surrounded by a transversely-elliptical raised border.

Moderate-sized scapular compartments, situated at level of distal half of aperture, face directly laterally. Suprascapular compartments small and directed upward. Extensive infra-scapular compartments on each side of zoecium are longitudinally depressed in middle line and have about seven septulae.

Dorsal surface very strongly arched in plane of axis of zoecium and depressed along lateral margins. A raised band extends distally from proximal connecting-tube aperture and, proximal to distal connecting-tube aperture, divides into two branches extending to tips of avicularia.

Axis of daughter zoecium inclined at 30 deg. to that of mother zoecium.

Ovicell not known.

Dimensions.—Single zoecium from Hamilton bore 80 feet–85 feet: Zoecium, length 0.57 mm., width 0.56; aperture, diameter 0.14.

Distribution.—Lower Miocene: Clifton Bank (Muddy Creek, Hamilton), Flinders, Batesford Tunnel marl, Hamilton bore 80 feet–85 feet, Balcombe Bay.

Observations.—This species is characterized by its usually laterally-directed avicularia, broad outline, strong denticles, and the transversely-elliptical raised border surrounding the central pore.

Macgillivray's *Strophipora harveyi* var. *lata* is raised to specific rank, since the above characters are practically constant and afford sufficient character to separate this form as a distinct species.

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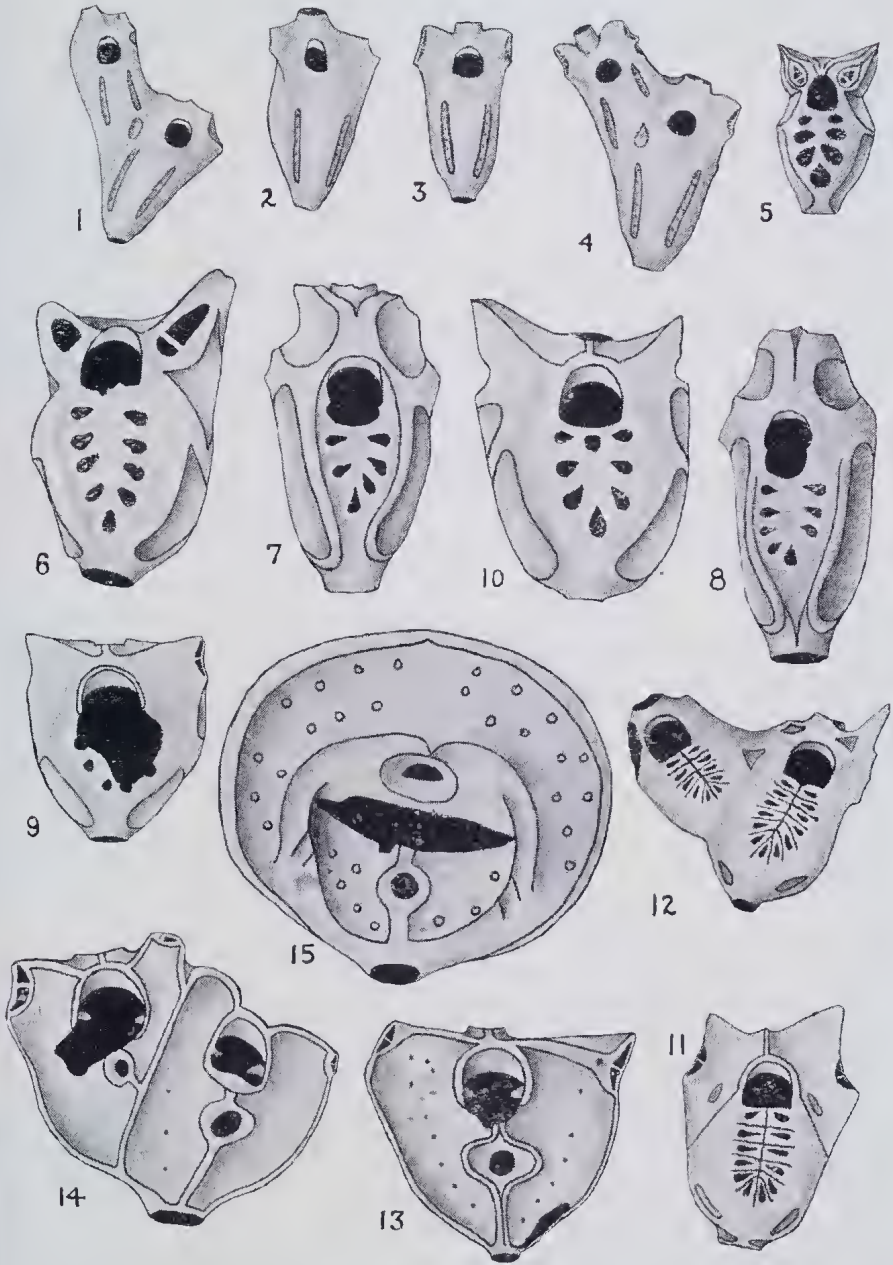
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Explanation of Plate III.

All figures (except fig. 5) drawn with camera lucida.

Magnification is $\times 54$, except where otherwise stated.

- Fig. 1.—*Vittaticella elegans* (Busk). Geminate pair from Forsyth's (below remanié nodule bed) Grange Burn, Hamilton (Stach Coll.). Nat. Mus. Coll., Regd. No. 13898.
- Fig. 2.—*V. elegans* (Busk). Single zoecium from same locality. Nat. Mus. Coll., Regd. No. 13898.
- Fig. 3.—*V. elegans* (Busk). Single zoecium from near Two Sisters' Is. (Bass Strait) (Coll. J. Gabriel). Nat. Mus. Coll., Regd. No. 68050.
- Fig. 4.—*V. elegans* (Busk). Geminate pair from same locality (Coll. J. Gabriel). Nat. Mus. Coll., Regd. No. 68050.
- Fig. 5.—*Scuticella urnula* (Macgillivray). Single Recent zoecium (modified from Levinsen, 1909), $\times 33$.
- Fig. 6.—*S. urnula* (Macgillivray). Single zoecium from Forsyth's (below remanié nodule bed), Grange Burn, Hamilton (Stach Coll.). Nat. Mus. Coll., Regd. No. 13899.
- Fig. 7.—*S. gippslandica*, sp. nov. Single zoecium (holotype) from Mitchell River at Bairnsdale (Stach Coll.). Nat. Mus. Coll., Regd. No. 13900.
- Fig. 8.—*S. gippslandica*, sp. nov. Single zoecium (paratype) from Largon Ck., off Toorloo Arm, 8 mls. E. of Lakes Entrance (Stach Coll.). Nat. Mus. Coll., Regd. No. 13901.
- Fig. 9.—*S. lata*, sp. nov. Single zoecium (paratype) from Forsyth's (below remanié nodule bed), Grange Burn, Hamilton (Stach Coll.). Nat. Mus. Coll., Regd. No. 13902.



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- Fig. 10.—*S. lata*, sp. nov. Single zooecium from holotype zoarium from Western Port (J. Gabriel Coll.). Nat. Mus. Coll., Regd. No. 68051.
- Fig. 11.—*Costaticella benecostata* (Levinsen). Single zooecium from Batesford Tunnel marl (Stach Coll.). Nat. Mus. Coll., Regd. No. 13903.
- Fig. 12.—*C. benecostata* (Levinsen). Geminate pair from Clifton Bank (Muddy Ck., Hamilton) (Stach Coll.). Nat. Mus. Coll., Regd. No. 13904.
- Fig. 13.—*Strophipora lata* Macgillivray. Single zooecium from Hamilton bore 80 ft.-85 ft. (Geol. Surv. Vic. Coll.). Nat. Mus. Coll., Regd. No. 13905.
- Fig. 14.—*S. lata* Macgillivray. Geminate pair from same locality. Nat. Mus. Coll., Regd. No. 13906.
- Fig. 15.—*S. excavata* Maplestone. Ovicell from Clifton Bank (Muddy Ck., Hamilton) (Macgillivray Coll.). Nat. Mus. Coll., Regd. No. 13907.
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